

WHAT IS CLAIMED IS:

Sub A1 → 1. A polymeric vehicle comprising an aqueous dispersion of a neutralized polymer in water, a co-solvent, and an isocyanate cross-linking agent comprising an isocyanate compound, wherein the polymeric vehicle is effective for providing a coating binder film, wherein the polymer is selected from the group consisting of condensation polymers, addition polymer and hybrid polymers of condensation and addition polymers, wherein the polymer has an acid value of from about 4 to about 70 prior to neutralization, and a solubility of at least about 50 weight percent in a hydrophilic organic solvent which solvent has a solubility of at least 5 weight percent in water, and wherein the aqueous dispersion has less than about 2 weight percent organic solvent, at least about 30 weight percent solids, a viscosity of less than about 20 poise at a temperature of about 25°C., and a mean particle size of not more than about 300 nm.

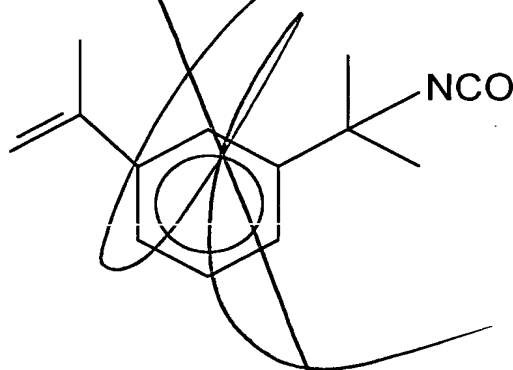
2. The polymeric vehicle of claim 1, wherein isocyanate compound is a polymeric isocyanate compound.

3. The polymeric vehicle of claim 1, wherein the isocyanate compound is a blocked isocyanate compound.

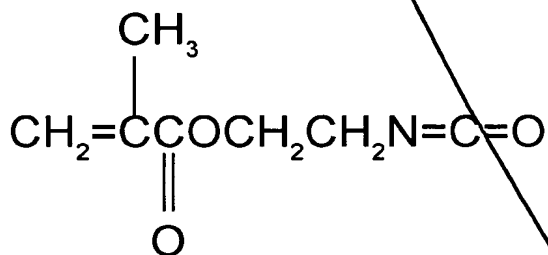
4. The polymeric vehicle of claim 1, wherein the isocyanate compound is an unblocked isocyanate compound.

5. The polymeric vehicle of claim 1, wherein the isocyanate compound is selected from the group consisting of hexamethylene diisocyanate (HDI), isophorone diisocyanate (IPDI), tetramethylxylene diisocyanate (TMXDI), trimethylene diisocyanate, tetramethylene diisocyanate, pentamethylene diisocyanate, 1,2-propylene diisocyanate, 2,3-butylene diisocyanate, 1,3-butylene

diisocyanate, 2,4,4-trimethylhexamethylene
 diisocyanate, 2,2,4-trimethylhexamethylene diisocyanate;
 cycloalkylene diisocyanates such as 1,3-cyclopentane--
 diisocyanate, 1,4-cyclohexane-diisocyanate 1,3-
 5 cyclohexane-diisocyanate, m-phenylene diisocyanate, p-
 phenylene diisocyanate, 4,4'-diphenyldiisocyanate, 1,5-
 naphthalene diisocyanate, 4,4'-diphenylmethane
 diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene
 diisocyanate, trimerized HDI, trimerize IPDI,
 10 triphenylmethane-4,4',4"-triisocyanate, 1,3,5-
 triisocyanatobenzene, 1,3,5-triisocyanatocyclohexane,
 2,4,6-triisocyanatotoluene and ω -isocyanatoethyl-2,6-
 diisocyanatocaproate,
 4,4'-diphenyldimethylmethane-2,2',5,5'-tetraisocyanate,

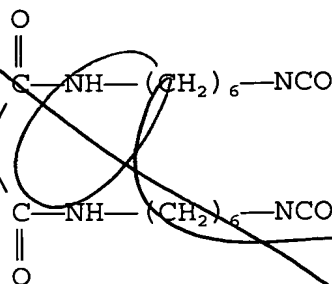
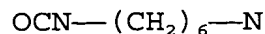


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and the biuret of hexamethylene diisocyanate (HDI), said
 biuret having the structure

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Sub A2

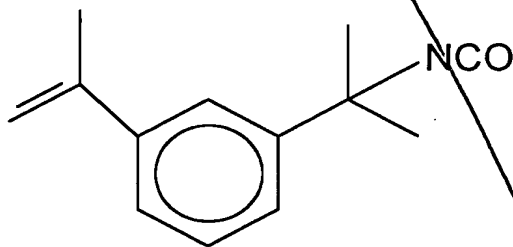
6. A formulated coating composition comprising an aqueous dispersion of a neutralized polymer in water, a co-solvent, and an isocyanate cross-linking agent comprising an isocyanate compound, the formulated coating composition being effective for providing a coating binder film, wherein the polymer is selected from the group consisting of condensation polymers, addition polymer and hybrid polymers of condensation and addition polymers, wherein the polymer has an acid value of from about 4 to about 70 prior to neutralization, and a solubility of at least about 50 weight percent in a hydrophilic organic solvent which solvent has a solubility of at least 5 weight percent in water, and wherein the aqueous dispersion has less than about 2 weight percent organic solvent, at least about 30 weight percent solids, a viscosity of less than about 20 poise at a temperature of about 25°C., and a mean particle size of not more than about 300 nm.

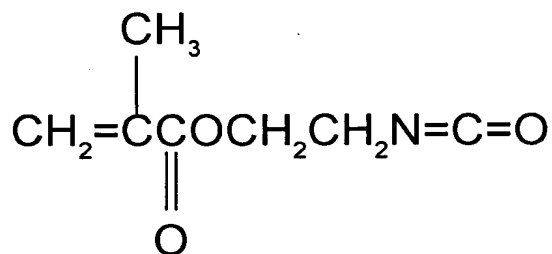
7. The formulated coating composition of claim 6, wherein isocyanate compound is a polymeric isocyanate compound.

8. The formulated coating composition of claim 6, wherein the isocyanate compound is a blocked isocyanate compound.

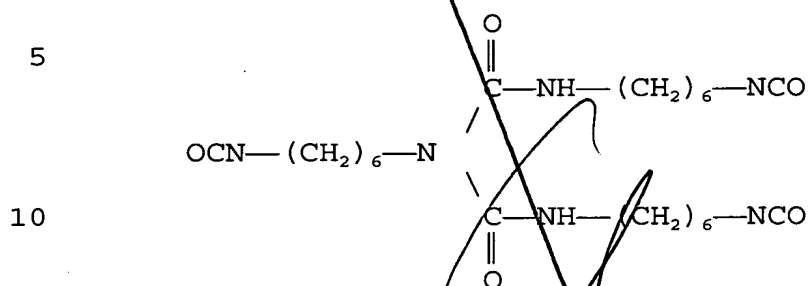
9. The formulated coating composition of claim 6, wherein the isocyanate compound is an unblocked isocyanate compound.

10. The formulated coating composition of claim 6,
5 wherein the isocyanate compound is selected from the group consisting of hexamethylene diisocyanate (HDI), isophorone diisocyanate (IPDI), tetramethylxylene diisocyanate (TMXDI), trimethylene diisocyanate, tetramethylene diisocyanate, pentamethylene diisocyanate,
10 1,2-propylene diisocyanate, 2,3-butylene diisocyanate, 1,3-butylene diisocyanate, 2,4,4-trimethylhexamethylene diisocyanate, 2,2,4-trimethylhexamethylene diisocyanate; cycloalkylene diisocyanates such as 1,3-cyclopentane--diisocyanate, 1,4-cyclohexane-diisocyanate 1,3-
15 cyclohexane-diisocyanate, m-phenylene diisocyanate, p-phenylene diisocyanate, 4,4'-diphenyldiisocyanate, 1,5-naphthalene diisocyanate, 4,4'-diphenylmethane diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, trimerized HDI, trimerize IPDI,
20 triphenylmethane-4,4',4''-triisocyanate, 1,3,5-triisocyanatobenzene, 1,3,5-triisocyanatocyclohexane, 2,4,6-triisocyanatotoluene and α -isocyanatoethyl-2,6-diisocyanatocaproate,
4,4'-diphenyldimethylmethane-2,2',5,5'-tetraisocyanate,





and the biuret of hexamethylene diisocyanate (HDI), said biuret having the structure



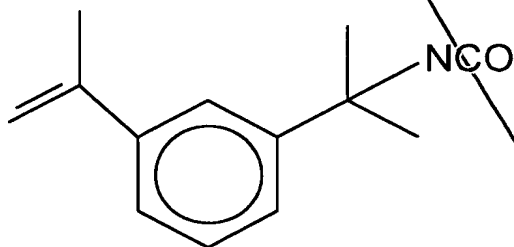
11. A polymeric vehicle comprising an aqueous dispersion of a neutralized polymer in water, a co-solvent, and an isocyanate cross-linking agent comprising and isocyanate compound, the polymeric vehicle being effective for providing a coating binder film, wherein prior to neutralization the polymer is a polyester polymer having an acid value of from about 10 to about 35 prior to neutralization and the dispersion has less than about 2 weight percent organic solvent, at least about 30 weight percent solids, a viscosity of less than about 10 poise at a temperature of about 25°C., and a mean particle size in the range of from about 40 to about 200 nm.

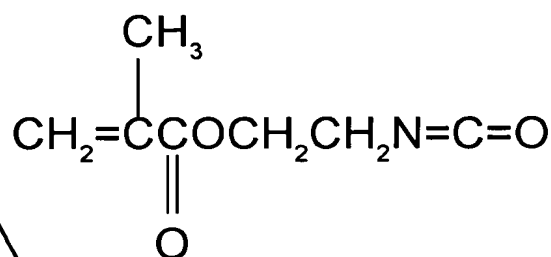
12. The polymeric vehicle of claim 11, wherein isocyanate compound is a polymeric isocyanate compound.

13. The polymeric vehicle of claim 11, wherein the isocyanate compound is a blocked isocyanate compound.

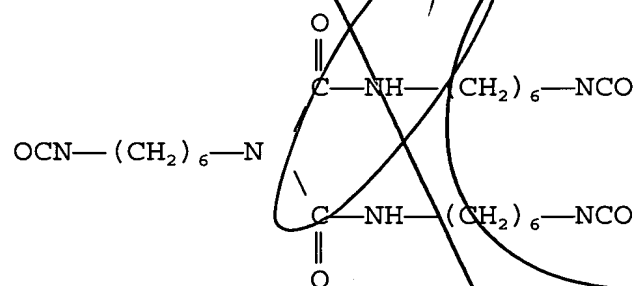
14. The polymeric vehicle of claim 11, wherein the isocyanate compound is an unblocked isocyanate compound.

5 15. The polymeric vehicle of claim 11, wherein the isocyanate compound is selected from the group consisting of hexamethylene diisocyanate (HDI), isophorone diisocyanate (IPDI), tetramethylxylene diisocyanate (TMXDI), trimethylene diisocyanate, tetramethylene
10 diisocyanate, pentamethylene diisocyanate, 1,2-propylene diisocyanate, 2,3-butylene diisocyanate, 1,3-butylene diisocyanate, 2,4,4-trimethylhexamethylene diisocyanate, 2,2,4-trimethylhexamethylene diisocyanate; cycloalkylene diisocyanates such as 1,3-cyclopentane--
15 diisocyanate, 1,4-cyclohexane-diisocyanate 1,3-cyclohexane-diisocyanate, m-phenylene diisocyanate, p-phenylene diisocyanate, 4,4'-diphenyldiisocyanate, 1,5-naphthalene diisocyanate, 4,4'-diphenylmethane diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene
20 diisocyanate, trimerized HDI, trimerize IPDI, triphenylmethane-4,4',4"-triisocyanate, 1,3,5-triisocyanatobenzene, 1,3,5-triisocyanatocyclohexane, 2,4,6-triisocyanatotoluene and ω -isocyanatoethyl-2,6-diisocyanatocaproate,
25 4,4'-diphenyldimethylmethane-2,2',5,5'-tetraisocyanate,





and the biuret of hexamethylene diisocyanate (HDI), said biuret having the structure



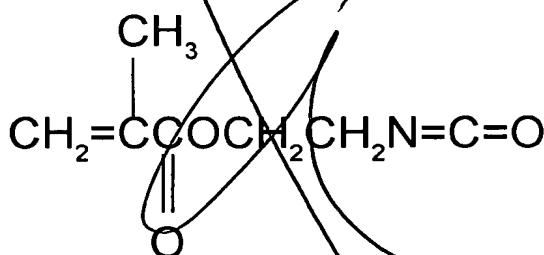
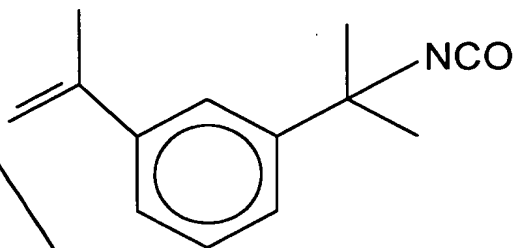
16. A formulated coating composition comprising an aqueous dispersion of a neutralized polymer in water, a co-solvent, and an isocyanate cross-linking agent comprising an isocyanate compound, the formulated coating composition being effective for providing a coating binder film, wherein prior to neutralization the polymer is a polyester polymer having an acid value of from about 10 to about 35 prior to neutralization and the dispersion has less than about 2 weight percent organic solvent, at least about 30 weight percent solids, a viscosity of less than about 10 poise at a temperature of about 25°C., and a mean particle size in the range of from about 40 to about 200 nm.

17. The formulated coating composition of claim 16, wherein isocyanate compound is a polymeric isocyanate compound.

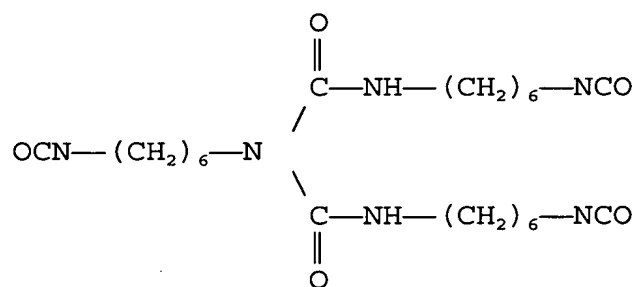
18. The formulated coating composition of claim 5 16, wherein the isocyanate compound is a blocked isocyanate compound.

19. The formulated coating composition of claim 16, wherein the isocyanate compound is an unblocked isocyanate compound.

20. The formulated coating composition of claim 10 16, wherein the isocyanate compound is selected from the group consisting of hexamethylene diisocyanate (HDI), isophorone diisocyanate (IPDI), tetramethylxylene diisocyanate (TMXDI), trimethylene diisocyanate, 15 tetramethylene diisocyanate, pentamethylene diisocyanate, 1,2-propylene diisocyanate, 2,3-butylene diisocyanate, 1,3-butylene diisocyanate, 2,4,4-trimethylhexamethylene diisocyanate, 2,2,4-trimethylhexamethylene diisocyanate; cycloalkylene diisocyanates such as 1,3-cyclopentane-- 20 diisocyanate, 1,4-cyclohexane-diisocyanate 1,3-cyclohexane-diisocyanate, m-phenylene diisocyanate, p-phenylene diisocyanate, 4,4'-diphenyldiisocyanate, 1,5-naphthalene diisocyanate, 4,4'-diphenylmethane diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene 25 diisocyanate, trimerized HDI, trimerize IPDI, triphenylmethane-4,4',4"-triisocyanate, 1,3,5-triisocyanatobenzene, 1,3,5-triisocyanatocyclohexane, 2,4,6-triisocyanatotoluene and ω-isocyanatoethyl-2,6-diisocyanatocaproate, 30 4,4'-diphenyldimethylmethane-2,2',5,5'-tetraisocyanate,



and the biuret of hexamethylene diisocyanate (HDI), said biuret having the structure



21. A polymeric vehicle comprising a first component and a second component, the first component comprising an aqueous dispersion of a neutralized polymer in water and a co-solvent, the second component comprising an isocyanate cross-linking agent comprising and isocyanate compound, the polymeric vehicle being

effective for providing a coating binder film after the first component is mixed with the second component, wherein prior to neutralization the polymer is a polyester polymer having an acid value of from about 10 to about 35 prior to neutralization and the dispersion has less than about 2 weight percent organic solvent, at least about 30 weight percent solids, a viscosity of less than about 10 poise at a temperature of about 25°C., and a mean particle size in the range of from about 40 to about 200 nm.

22. A method for forming a coating binding film, said method comprising:

a) providing a first component comprising an aqueous dispersion of a neutralized polymer in water and a co-solvent, wherein prior to neutralization the polymer is a polyester polymer having an acid value of from about 10 to about 35 prior to neutralization and the dispersion has less than about 2 weight percent organic solvent, at least about 30 weight percent solids, a viscosity of less than about 10 poise at a temperature of about 25°C., and a mean particle size in the range of from about 40 to about 200 nm;

b) providing a second component comprising an isocyanate cross-linking agent comprising an isocyanate compound effective for cross-linking the polymer;

c) mixing the first component and the second component to form a first component/second component mixture; and

d) applying the first component/second component mixture to form the coating binder film.

Sub A3 23. A formulated coating composition comprising a first component and a second component, the first component comprising an aqueous dispersion of a neutralized polymer in water and a co-solvent, the second

Sub A8
cont.

component comprising an isocyanate cross-linking agent which comprises an isocyanate compound, the first and second component when mixed being effective for providing a coating binder film, wherein the polymer is selected

5 from the group consisting of condensation polymers, addition polymer and hybrid polymers of condensation and addition polymers, wherein the polymer has an acid value of from about 4 to about 70 prior to neutralization, and a solubility of at least about 50 weight percent in a

10 hydrophilic organic solvent which solvent has a solubility of at least 5 weight percent in water, and wherein the aqueous dispersion has less than about 2 weight percent organic solvent, at least about 30 weight percent solids, a viscosity of less than about 20 poise

15 at a temperature of about 25°C., and a mean particle size of not more than about 300 nm.

24. The formulated coating composition of claim 23, wherein isocyanate compound is a polymeric isocyanate compound.

20 25. The formulated coating composition of claim 23, wherein the isocyanate compound is a blocked isocyanate compound.

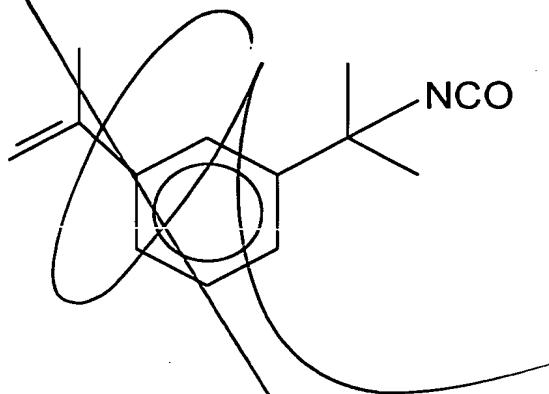
26. The formulated coating composition of claim 23, wherein the isocyanate compound is an unblocked

25 isocyanate compound.

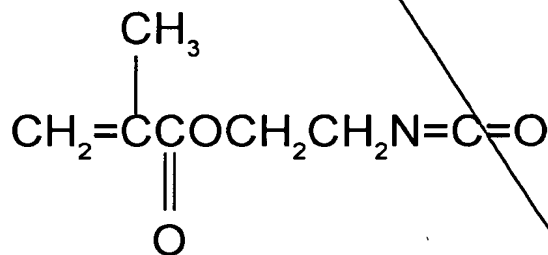
27. The formulated coating composition of claim 23, wherein the isocyanate compound is selected from the group consisting of hexamethylene diisocyanate (HDI), isophorone diisocyanate (IPDI), tetramethylxylene

30 diisocyanate (TMXDI), trimethylene diisocyanate, tetramethylene diisocyanate, pentamethylene diisocyanate, 1,2-propylene diisocyanate, 2,3-butylene diisocyanate,

1,3-butylene diisocyanate, 2,4,4-trimethylhexamethylene
 diisocyanate, 2,2,4-trimethylhexamethylene diisocyanate;
 cycloalkylene diisocyanates such as 1,3-cyclopentane--
 diisocyanate, 1,4-cyclohexane-diisocyanate 1,3-
 5 cyclohexane-diisocyanate, m-phenylene diisocyanate, p-
 phenylene diisocyanate, 4,4'-diphenyldiisocyanate, 1,5-
 naphthalene diisocyanate, 4,4'-diphenylmethane
 diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene
 diisocyanate, trimerized HDI, trimerize IPDI,
 10 triphenylmethane-4,4',4''-triisocyanate, 1,3,5-
 triisocyanatobenzene, 1,3,5-triisocyanatocyclohexane,
 2,4,6-triisocyanatotoluene and ω -isocyanatoethyl-2,6-
 diisocyanatocaproate,
 4,4'-diphenyldimethylmethane-2,2',5,5'-tetraisocyanate,

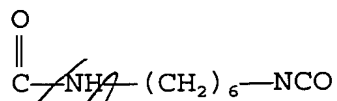
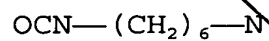


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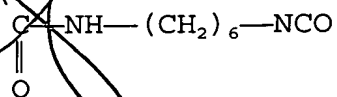


and the biuret of hexamethylene diisocyanate (HDI), said
 biuret having the structure

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Add A4